

Application of Logistics Management in Disaster Management at Cianjur Regional General Hospital in 2023

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ABSTRACT

Disaster logistics management is an effort to arrange logistics raw materials in the implementation of disaster management, which consists of planning, procurement, storage, distribution, transportation, and receiving. Cianjur Hospital is one of the health facilities affected by the Cianjur earthquake; due to the earthquake, almost all parts of the hospital were damaged, so some health services were carried out in emergency tents. The purpose of this study was to obtain an analysis of the disaster logistics management system at RSUD Cianjur. The design used is qualitative with a descriptive approach. The informants in this study were 5 employees of Cianjur Hospital. Data collection is carried out through in-depth interviews, document studies, and observations. Analysis data processing uses data reduction analysis, data presentation, and conclusions. The results showed that the disaster logistics management system at Cianjur Hospital had appropriate planning, but there was little difficulty meeting needs. At the time of procurement and/or receipt, there is a discrepancy in needs and an unclear identity of the sender. There are two logistics warehouses, namely inside the building and in the emergency tent, but the warehouse security in the emergency tent is less safe and the place is inadequate. In distribution, there is speed, accuracy, and the amount of distribution that is sometimes not right. It is recommended that hospitals optimize the performance of each human resource as well as write SOPs regarding disaster logistics management systems.

Keywords: disaster, hospital, logistics management

INTRODUCTION

Disasters are events or series of events that cause human suffering such as damage to property, environmental damage, facilities and infrastructure, and have the potential to disrupt human life and livelihood. Due to its geographical location, Indonesia is prone to natural disasters such as earthquakes, volcanic eruptions, tsunamis, floods, droughts, and landslides (Safri, 2016).

On November 21, 2022, at noon at 13:21:10 WIB, there was an earthquake with a magnitude of 5.6 in the Cianjur area, West Java. Based on BMKG data, until November 22, 2022, 140 aftershocks with a strength of 1.2 – 4.2 Magnitude have been recorded with an average depth of about 10 Km, of which 5 earthquakes were felt by the surrounding community (Sormin, Tampubolon, & Sinaga, 2023). The main earthquake with a magnitude of 5.6 impacted and was felt in the city of Cianjur with an intensity

scale of V-VI MMI (*Modified Mercalli Intensity*); Garut and Sukabumi IV-V MMI; Cimahi, Lembang, Bandung City, Cikalong Wetan, Rangkasbitung, Bogor, and Bayah with MMI III intensity scale; South Tangerang, Jakarta, Depok with intensity scale II-III MMI. According to information from BNPB, the earthquake caused 334 casualties, more than 50,000 houses were damaged, and refugees currently reached 114,683 people from 41,166 households (Susila, Dewi, & Alamsyah, n.d.).

The earthquake that occurred in the Cianjur area was a shallow-motion tectonic earthquake caused by the shift of the Cimandiri Fault. Cianjur is one of the districts crossed by the Cimandiri fault. This Cimandiri fault is an active fault or shear fault along 100 Km (Prayogo, 2023). The Cimandiri Fault area stretches from the mouth of the Cimandiri River in Pelabuhan Ratu, Sukabumi Regency, heading northeast through Cianjur Regency, West Bandung Regency, and Subang Regency. The Cimandiri fault is divided into 3 segments, namely the Cimandiri segment with an ascending fault mechanism, the Nyalindung-Cibeber segment with an ascending fault mechanism, and the Rajamandala segment with an irrigating shear fault mechanism, thus making this region prone to earthquake hazards. (Supendi, Jatnika, Sianipar, & Ali, 2022).

The earthquake disaster in Cianjur caused massive damage. In addition to casualties, the damaged property was not small. The National Disaster Management Agency (BNPB) recorded 56 damaged infrastructures, namely 363 damaged school buildings, 144 places of worship, 16 office buildings, and 3 health facilities ((Wibowo, Meilano, & Virtriana, 2024);(Hendriati & Achmat, 2024)).

Cianjur Hospital is one of the health facilities affected by the Cianjur earthquake on Monday, November 21, 2022, with a magnitude of 5.6. As a result of the earthquake, almost all parts of the hospital were affected by damage to many walls inside the hospital, which were cracked, ceilings dislodged, and broken tiles. No exception in the emergency room, which is also used as an evacuation place for earthquake victims; victims in the emergency room are forced to lie down with views of damaged buildings. In addition to the emergency room, the inside of the hospital was also vacated for security reasons. As a result, the victims were forced to lie in evacuation tents. Until now, several health services have been carried out in the emergency tent of Cianjur Hospital, including inpatient services, childbirth services, hemodialysis services, and emergency services for surgery. Due to the damaged hospital building, patients with high risk were referred to various hospitals in Bogor, Sukabumi, and Bandung.

After the earthquake occurred, many volunteers brought logistical assistance to Cianjur Hospital because of the many limited logistical supplies such as velbed, oxygen concentrator, HEOC operational kit, medicines, masks, PPE, antigen kits, emergency kits, handsoons, body bags, diapers for children and adults, Kesling packages, family kits, tents, blankets, mats, women's and men's clothing packages, ready meals, to toiletries. The logistics distribution process is also supported by the regional apparatus of Cianjur Regency including the Human Resources Personnel and Development Agency (BKPSDM), the Licensing Office, the Social Service, the Regional Disaster Management Agency (BPBD), the Fisheries and Livestock Office, the Agriculture Office, the Industry and Trade Office, the Library and Archives Office, Tagana and Satpol PP (Supendi et al., 2023).

Logistics has an important role in disaster management efforts, especially during

pre-disaster, preparedness, and disaster response, to be able to ensure the right assistance goods, right quantity, right quality, right target, on time, right reporting, and on cost (MACK, n.d.). Effective, efficient, and reliable logistics management will be an important factor in disaster management (Iskaputri, Razak, & Arifin, 2020). Logistics management system and disaster management equipment is the management of logistics and equipment including planning, procurement, warehousing, distribution, and elimination in order to achieve goals and objectives effectively and efficiently (Negi & Negi, 2021). In addition, logistics management and disaster management equipment is a system that explains the logistics and equipment needed to overcome disasters in the pre-disaster period, during disasters and in the post-disaster.

Previous studies have highlighted the critical role of logistics in disaster management, emphasizing the need for effective and efficient logistics management systems to ensure timely and appropriate assistance during pre-disaster, preparedness, and response phases ((MACK, n.d.); (Iskaputri et al., 2020)). These studies have underscored the importance of logistics planning, procurement, warehousing, distribution, and disposal in achieving disaster management goals and objectives (Negi & Negi, 2021).

The novelty of this study resides in its emphasis on amalgamating logistics management with disaster management equipment. While prior studies have dissected logistics and disaster management as distinct entities, this research endeavors to investigate the seamless integration of these two facets into a unified system. By scrutinizing the logistics requirements and necessary equipment throughout every stage of disaster management, ranging from pre-disaster strategizing to post-disaster rehabilitation, this study aims to furnish a holistic comprehension of streamlining logistics and equipment provisions for disaster readiness and response.

Moreover, the objective of this study is to pinpoint optimal methods and tactics for overseeing logistics and disaster management equipment in a unified fashion, leveraging insights from both domains. Through amalgamating existing literature and scrutinizing case studies or real-world instances, this research intends to enrich the repertoire of more productive and streamlined approaches to disaster logistics management. Furthermore, by underscoring the significance of harmonized coordination and cooperation among stakeholders engaged in logistics and disaster management, this study will proffer actionable suggestions for bolstering disaster preparedness and response endeavors.

Based on the above, the researcher conducted research on the application of logistics management in disaster management at the Cianjur Regional General Hospital. This study aims to determine disaster logistics management at Cianjur Regional General Hospital which consists of planning, procurement and/or receiving, storage, and distribution processes.

RESEARCH METHODS

This research design uses a Qualitative Descriptive approach to understand human or social phenomena related to logistics control in disaster management at Cianjur Regional General Hospital. The object of this study is logistics control policies and procedures in disaster management at the hospital. The source of the research data

came from five informants selected based on certain criteria, namely understanding of disaster logistics policies, mastery of work processes and tasks, and involvement in the activities studied. Informants consist of the Director or Deputy Director of the Hospital, the Head of Finance, the K3RS Committee, Disaster Logistics Staff, and Asset Coordination.

The data collection method is carried out through triangulation, namely in-depth interviews, observations, and document reviews. In-depth interviews were conducted to obtain detailed views from informants on logistics control policies and procedures in disaster management. Observations are made to gain a direct understanding of the work processes carried out related to logistics control. In addition, document reviews are conducted to collect recorded data regarding existing policies and procedures in writing.

The population in this study was all individuals involved in disaster logistics control at Cianjur Regional General Hospital. The sample consists of five informants selected based on predetermined criteria.

Data analysis is carried out qualitatively by summarizing and analyzing information obtained from interviews, observations, and document reviews. The results of the analysis will be presented in the form of a comprehensive and complex description of logistics control policies and procedures in disaster management at Cianjur Regional General Hospital.

RESULTS AND DISCUSSION

Input

A. Man

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the human resources involved in this disaster logistics management system were the Deputy Director of Services, down to the Head of Supporting Affairs, then the logistics coordinator of facilities and infrastructure, the coordinator of hospital assets, as well as the person in charge of medicines and medical devices by the Head of Nursing. In addition, there is also a Disaster Preparedness Team at Cianjur Regional General Hospital.

B. Money

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that there was no special budget for disaster logistics management, but there was a budget for training before the disaster. The hospital only accepts donations, so it only receives, accommodates, and distributes them.

C. Materials

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the materials needed by the Cianjur Regional General Hospital after the earthquake were consumables such as food, drinks, medicines, medical equipment such as intravenous fluids, IV tubes, infusion needles, syringes as well as medical devices for wound services because of the large number of victims affected and buried in the rubble of buildings.

Tents are also needed; tents are the most needed material because almost all paralyzed buildings cannot be used, especially buildings for inpatient services. Therefore, all patients are served in emergency care. In addition, Cianjur Regional

General Hospital needs health workers. Based on the Regulation of the Minister of Defense of the Republic of Indonesia Number 39 of 2014 concerning Disaster Management in Hospitals of the Ministry of Defense and the Indonesian National Army Article 9 Hospitals must provide command posts, information/public relations centers, evacuation tents, rapid evacuation routes, gathering places, patient assessment places (*triage*), emergency operating rooms, open additional wards, morgues, soup kitchens, backup logistics warehouses, Emergency exits, *Rump*, and Line link with those adjacent to the Hospital.

D. Planning Process

The planning process is an activity through identifying needs or initial steps to determine who needs it, what I need, where, when, and how to deliver it to produce minimum standards of needs in disaster management (Mimin, Paripurno, & Lestari, 2020). This planning requires accuracy, skills, and the ability to know exactly the conditions that disaster victims face in order to overcome them.

The purpose of this planning is to find out how many victims affected by disasters need logistical assistance and equipment, know how much logistical assistance and equipment are needed, know the types of needs (clothing, food, shelter), know how to deliver aid, know the person in charge of the recipient group, and know when aid must be delivered. This planning consists of preparing minimum needs standards, identifying needs, and preparing short, medium, and long-term needs (Agyekum, Amjad, Mohsin, & Ansah, 2021). Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that planning was carried out by calculating and looking at the capacity of the hospital to accommodate patients, so the needs were adjusted to the capacity of the hospital. In addition, coordination meetings or evaluations of any needs and previous needs have been met or not. The process of selecting the logistics type at the Cianjur Regional General Hospital is adjusted to the needs. In hospital planning, plan the needs that have led in the event of a disaster.

The time for disaster logistics management planning was carried out before the disaster, in addition to holding disaster management training in areas such as earthquake management and fire management. However, at the time of the disaster, it was not in accordance with the planned planning. The way to ensure effective and efficient logistics planning at Cianjur Regional General Hospital is to look at patient safety and comfort. In addition, reports are made, and periodic evaluations of the availability of logistics for disaster management are monitored.

The challenge of planning disaster logistics management of the Cianjur General Hospital is the difficulty of meeting needs due to the large demand. However, the stock in the market, especially in Cianjur itself, is very limited. In addition, things that are not taken into account occur such as the accuracy of using tents with the influence of weather. If the disaster recurs, Cianjur Regional General Hospital will prepare starting from the information system, reception flow, distribution flow, and recording to preparing logistical reserves for the disaster.

E. Procurement and/or acceptance

This logistics receipt and/or procurement process starts from recording or inventory including the category of logistics or equipment, from where the aid was

received, when it was received, what type of assistance, how much amount, how to use or operate it, whether there is a demand for whom this assistance is addressed. This process is carried out by disaster management organizers and must be inventoried or recorded (Agyekum et al., 2021).

The purpose of this procurement and/or receipt is to determine the types of logistics and equipment received from various sources, to match the needs with existing logistics and equipment, to inform logistics and equipment according to the priority scale of needs, as an effort to control and supervise logistics and equipment countermeasures, and to adjust in terms of storage. The logistics procurement process is carried out in a planned manner by taking into account the type and number of needs, which can be done through auctions, elections and direct appointments according to needs. Logistical receipt through grants is carried out based on applicable laws and regulations by taking into account the conditions in emergencies (Kristian, 2022).

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the hospital has an RBA (Business Plan and Budget) from each of the smallest units that pursues to the DPA (Budget Implementation Document) for one year but an evaluation is carried out every 6 months to determine any deficiencies or advantages. In addition, to see effectiveness and efficiency by looking at stocks that are not too much or can be interpreted as enough.

The time of procurement and/or receipt of disaster logistics management is in the post-disaster period but hospitals always have logistical reserves that can be sufficient for 2-3 months. So, at the time of this disaster, the hospital used the existing stock. How to determine these logistical needs by evaluating field needs and then this evaluation is added with possibilities for future improvements.

According to the information obtained, the absence of special logistics quality provisions other than the logistics received should not expire. The standards taken are patient safety standards and are viewed in numbers. In addition to the absence of logistics quality provisions, hospitals also do not consider logistics vendors or providers because emergencies and logistics stocks in the market are not many and very difficult.

To control expenses during disasters, namely daily, monthly, and semester reports. In addition, by comparing needs in the field with procurement. The challenges of procurement and/or receipt of disaster logistics management of the Cianjur General Hospital are not easy to fulfill due to limited stock and providers, goods received are not as needed, and the identity of senders who do not want to be known, which causes recording is lacking.

F. Warehousing

Warehousing is managing the receiving, storage, maintenance, and expenditure of logistics and equipment in the warehouse. The procedure for determining warehouses is divided into the location of ease of access, type of warehouse, storage capacity and facilities, and security and safety systems (Regulation of the National Disaster Management Agency of the Republic of Indonesia No. 4 of 2018 concerning Logistics and Equipment Management System, 2018).

The warehousing process starts with receiving logistics submitted to warehousing and storage units accompanied by minutes of receipt and proof of receipt of logistics at that time. According to the Standard Operating Procedure (SOP) for Disaster Logistics and Equipment Management, the purpose of this meeting is to record the type, quantity, quality, condition of logistics and equipment, time, and identity of officers, maintain logistics conditions from damage and loss or reduction in quality standards, facilitate logistics distribution using *first-in-first-out* and first-expired first-out methods, and guarantee the availability of logistics at all times (Mahardika & Setianingsih, 2018).

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the logistics storage room provided could meet the needs and ensure logistics availability, namely by preparing a logistics warehouse that was not only one and with a large room according to the number of logistics. In addition, monitoring evaluation is also carried out by presenting those in charge of logistics. Meanwhile, the way to ensure the feasibility of this logistics is by storing it in accordance with the temperature provisions of each logistics and, of course, storing it neatly. In addition, there are also periodic visits to check availability and security, both for theft and damage.

To determine logistics storage, namely by means of *real* needs plus future needs. This logistics is divided into three categories, namely consumables, medicines, and assets. The three categories in storage have their respective persons in charge. Inventory is organized and managed by administrating receipts, storage, and expenses.

If logistical damage is found, all are separated, then reported to the provider that there is damage and will be destroyed or eliminated logistics. If the logistics come from donations, a minutes are made for their destruction, as well as if the logistics are provided by the hospital.

To ensure the security of this warehouse, namely by arranging warehouse storage that is separate from other buildings, there are also guards for security. Safety and security during logistics picking and storage are achieved by first ensuring that the room is safe and then wearing PPE or personal protective equipment such as head protection, foot protection, and hand protection.

The challenge of warehousing disaster logistics management of the Cianjur General Hospital is due to the damaged building, so logistics storage is required to be stored in emergency tents whose security is very lacking. In addition, the place is inadequate, so if there is an excess of goods, it is difficult to place it.

G. Distribution

Distribution is a distribution system for delivering logistics from the warehouse to the intended target. Based on the needs inventory data, a logistics distribution plan is prepared accompanied by supporting data, which is based on requests and obtaining approval from officials authorized in disaster management (Ye, Jiao, & Yan, 2020).

Distribution planning consists of who will receive assistance, the priority of logistical assistance needed when it will be delivered, location, mode of delivery, means of transportation used, and who is responsible for the delivery. This

distribution aims to know the target recipients precisely, know the type and amount of assistance that must be delivered, plan how to deliver or transport, hand over logistical assistance to recipients, and ensure the security, safety, and integrity of logistical assistance during the transportation process from the warehouse to the recipient's destination (Arif, Wang, Chen, & Chen, 2019).

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the way to manage distribution is effective and efficient, namely by holding direct ball pick-ups or sending directly to tents in need, the handover was not handed over to individuals but handed over to each installation. However, in the nature of medical devices and assets, the person in charge of logistics waits in the warehouse and each installation that requires it must make a delivery or request for a request according to their needs.

To ensure that this logistics distribution is carried out in accordance with its priorities and needs, namely with proof of receipt from each installation, in addition to picking tests or directly going to the field to ensure the suitability of needs with the logistics that have been distributed. Meanwhile, how to ensure the achievement of this need is by checking logistics requests and then with documentation when handing over logistics. The documentation can be in the form of photos or proof of receipt. In addition, there are also health workers who are responsible for several patients and are tasked with ensuring the needs of patients, be it food, clothing, to toiletries.

Distribution transportation at this hospital is by using trolleys, and if the reach is far, the hospital has a car unit for logistics distribution. If there are accessibility problems or road conditions that might affect distribution, they are addressed by creating and appointing officers in three directions. One left way, one right way, and one middle direction to prevent possible delays in arriving time. In addition, if access cannot be passed by a trolley, the officer transports manually. This distribution time is open 24 hours, so when there is a request for anything, it is immediately fulfilled, but informant 5 said that those who came to ask for logistics were open from 08.00 WIB to 20.00 WIB.

The challenges of this distribution are the speed of distribution, the accuracy of distribution, as well as the amount of distribution. In addition, due to the fairly spread area and many logistical needs, there is a queue for logistics distribution.

B. Output

A. Strength

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the strength of the logistics management system at the Cianjur Regional General Hospital was to have reliable and very compact human resources, all of whom played an important role in handling the disaster.

B. Debilitation

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the weakness of the logistics management system at the Cianjur Regional General Hospital was the limited goods on the market, especially when procuring tents, besides when receiving goods, the logistics team often found expired or expired logistics.

C. Challenge

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the challenge of the logistics management system at the Cianjur Regional General Hospital was that the hospital must contain standardization of disaster management starting from before the disaster, during the disaster, and after the disaster. In addition, the challenge is when, at the time, the goods needed are not on the market or are very difficult to obtain.

D. Threat

Based on the results of research and interviews at the Cianjur Regional General Hospital, it was found that the threat to the logistics management system at the Cianjur Regional General Hospital was the reaction of the disaster victims who were quite pressed because they wanted to meet all their needs, and the hoax news spread about the non-distribution of aid and the non-compliance with regulations.

The disaster logistics management system implemented at Cianjur Regional General Hospital demonstrated effectiveness in orchestrating disaster response operations, particularly in the realms of planning, procurement, warehousing, and material distribution. The hospital's planning phase encompassed the identification of needs, capacity assessment, and collaboration with various stakeholders to ensure readiness in accommodating patients and delivering essential services. Similarly, the procurement procedures proved efficient, leveraging donations and inventory management to guarantee timely availability of necessary materials (Kholis, Syah, & Lubis, 2021). Furthermore, the warehousing and distribution processes operated smoothly, employing emergency tents for storage and efficient dissemination of materials to affected areas.

The research also brought attention to the obstacles encountered by the hospital in overseeing the disaster response, such as the limited availability of goods in the market and the struggle to address the needs of all patients. These hurdles align with the observations of previous studies examining disaster management in Indonesia. In essence, the study furnishes significant perspectives on the disaster logistics management system adopted by Cianjur Regional General Hospital, emphasizing the significance of proficient planning, procurement, warehousing, and distribution in disaster mitigation. Moreover, it sheds light on the complexities hospitals face in handling disaster responses and underscores the ongoing necessity for research and enhancements in this domain.

CONCLUSION

Based on the results of research at the Cianjur Regional General Hospital, it can be concluded that the disaster logistics management system has involved staff in accordance with their fields, including the Deputy Director of Services, Head of Supporting Affairs, logistics coordinator, and disaster preparedness team. However, there are limitations related to financial aspects, where hospitals only rely on external donations without a special budget for disaster logistics management. Post-earthquake material needs are mainly focused on consumables and medical equipment, with emergency tents being one of the main needs due to building damage. The process of planning, procurement, warehousing, and logistics distribution has been carried out,

although there are still obstacles such as difficulties in meeting needs due to limited stock on the market, goods that are not in accordance with what is needed, and incomplete records. Nevertheless, the cohesiveness and ability of the staff became a strength in the disaster logistics management system. However, there are weaknesses such as limited goods on the market and expired logistics findings. The main challenge for hospitals is to standardize disaster management before, during, and after a disaster. Another challenge is the availability of goods that are difficult to market. The main threat comes from the reaction of disaster victims who ask for their needs to be met and the spread of hoax news. Therefore, efforts are needed to overcome challenges and manage threats to improve the effectiveness of the disaster logistics management system at Cianjur Regional General Hospital.

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